

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A probe for measuring an electric potential of a cell, said probe being ~~arranged to be used~~ configured for use with a sucking device, said probe comprising:

a plate having a ~~surface; surface, the plate having~~

a first cavity provided in the surface of the plate, ~~the first cavity having a bottom surface;~~

a second cavity ~~provided in the bottom surface of the first cavity;~~ -and

a first flow passage provided in the plate, ~~the first cavity having a bottom surface, the second cavity being provided in the bottom surface of the first cavity;~~ the first flow passage having a first opening and a second opening, the first opening of the first flow passage opening to the second cavity, the second opening of the first flow passage opening outside the plate; and

a sensor element provided in the first cavity, the sensor element including a thin plate and a supporting substrate, the thin plate having a first surface and a second surface opposite to the first surface; ~~surface of the thin plate, the thin plate having~~

a through-hole provided ~~therein; in the thin plate,~~ the through-hole having a first opening and a second opening, ~~the first opening of the through-hole opening which opens~~ to the first surface of the thin plate, ~~the plate and a second opening of the through-hole opening which opens~~ to the second surface of the thin plate and ~~connected with~~ the second cavity of the plate, and

a measuring stick having a first end and a second end, the first end being connected with the plate; and

a tube connected to the second opening of the first flow passage, the tube extending along the measuring stick to the second end of the measuring stick,

wherein the a-supporting substrate of the sensor element is provided around the thin plate-

and in the first cavity of the plate,

wherein the first flow passage ~~allows is configured to allow~~ fluid to flow ~~therein, and in~~  
~~the plate such that~~ the sucking device is ~~arranged to be coupled with the second opening of the~~  
~~first flow passage so as to~~ operable to suck the fluid flowing in the first flow ~~passage. passage,~~  
and

—wherein the second opening of the second flow passage is arranged to be coupled to a  
pouring device, and the pouring device is operable to put fluid into the second opening of the  
second flow passage.

2. (Previously Presented) The probe of claim 1, wherein the bottom surface of the first cavity  
and the second surface of the thin plate of the sensor element are flush with each other.

3. (Currently Amended) The probe of claim 2, wherein  
the supporting substrate of the sensor element ~~have~~ has a first surface and a second  
surface, the first surface of the supporting substrate facing ~~towards in~~ a direction identical to a  
direction ~~towards~~ which the surface of the plate faces, the second surface of the supporting  
substrate ~~is being~~ provided on the bottom surface of the first cavity of the plate, and  
a third cavity is provided on the first surface of the thin plate.

4. (Previously Presented) The probe of claim 1, wherein the supporting substrate of the  
sensor element is bonded to the plate.

5. (Currently Amended) The probe of claim 1, ~~wherein the plate further have~~ further

comprising

a second flow passage provided ~~therein, in the plate,~~ the second flow passage having a first opening and a second opening, the first opening of the second flow passage opening to the second cavity, the second opening of the second flow passage opening outside the plate.

6. (Canceled)

7. (Currently Amended)      The probe of claim 1, 5, further comprising

a valve,

wherein the second opening of the second flow passage is configured to be coupled to a pouring device, and wherein a the valve is ~~arranged~~ configured to be connected between the pouring device and the second flow passage.

8. (Previously Presented)      The probe of claim 5, wherein the second flow passage has a sectional area not smaller than  $0.01\text{mm}^2$ .

9. (Previously Presented)      The probe of claim 5, wherein the second flow passage has a curved portion.

10. (Currently Amended) The probe of claim 5, wherein the plate includes a bump which is provided between the first flow passage and the second flow passage ~~and which projects, the~~ bump projecting toward the second cavity.

11. (Previously Presented) The probe of claim 1, wherein the first flow passage has a sectional area not smaller than  $0.01\text{mm}^2$ .

12. (Previously Presented) The probe of claim 1, wherein the first flow passage has a curved portion.

13. (Previously Presented) The probe of claim 1, further comprising electrodes provided on the sensor element around the first opening of the through-hole and the second opening of the through-hole, respectively.

14. (Currently Amended) The probe of claim 1, ~~wherein the thin plate of the sensor element has a pocket provided therein, further comprising~~

at least one pocket, each pocket of the at least one pocket being provided on at least one of the first opening of the through-hole and the second opening of the through-hole of the thin plate, each pocket of the at least one pocket having a diameter larger than a diameter of the through-hole of the thin plate.

15. (Currently Amended) The probe of claim 1, wherein the plate comprises a material which transmits light, ~~material transmitting visible light therein.~~

16. (Currently Amended) The probe of claim 1, wherein the thin plate of the sensor element comprises a material which transmits light, ~~material transmitting visible light therein.~~

17. (Previously Presented) The probe of claim 1, wherein the plate includes a bump projecting toward the second cavity.

18. (Previously Presented) The probe of claim 1, wherein the surface of the plate and the first surface of the thin-plate of the sensor element are flush with each other.

19. (Currently Amended) The probe of claim 18, wherein  
the supporting substrate of the sensor element ~~have~~ has a first surface and a second surface, the first surface of the supporting substrate facing ~~towards~~ in a direction identical to a direction ~~towards~~ which the surface of the plate faces, the second surface of the supporting substrate is provided on the bottom surface of the first cavity of the plate, and  
a third cavity is provided on the first surface of the thin plate.

20-33. (Canceled)

34. (New) The probe of claim 5, wherein the second opening of the second flow passage is configured to be coupled to a pouring device for supplying fluid into the second opening of the second flow passage.

35.(New) The probe of claim 15, wherein the material of the plate transmits light such that the second cavity can be monitored from below the surface of the plate.

36.(New) The probe of claim 16, wherein the material of the thin plate transmits light such that the second cavity can be monitored from above the surface of the plate.

37. (New) The probe of claim 1, wherein the measuring stick extends away from the plate such that the probe can be submerged in a culture solution with the measuring stick extending through the surface of the culture solution.

38. (New) The probe of claim 1, wherein the tube extends from the first end of the measuring stick to the second end of the measuring stick.

39. (New) The probe of claim 1, wherein the second opening of the first flow passage is configured to be coupled to the sucking device so as to suck the fluid in the first flow passage.

40. (New) A probe for measuring an electric potential of a cell, said probe being configured for use with a sucking device, said probe comprising:

a plate having an upper surface;

a first cavity provided in the upper surface of the plate, the first cavity having a bottom surface;

a second cavity provided in the bottom surface of the first cavity;

a first flow passage provided in the plate, the first flow passage having a first opening and a second opening, the first opening of the first flow passage opening to the second cavity, the second opening of the first flow passage opening outside the plate;

a sensor element provided in the first cavity, the sensor element having a thickness substantially equal to a depth of the first cavity such that an upper surface of the sensor element is substantially flush with the upper surface of the plate and a lower surface of the sensor element contacts the bottom surface of the first cavity; and

a through-hole provided in the sensor element such that the second cavity is in fluid communication with an external environment at the upper surface of the plate,

wherein the first flow passage is configured to allow fluid to flow in the plate such that the sucking device is operable to suck the fluid flowing in the first flow passage.

41. (New) The probe of claim 40, further comprising an electrode contacting the lower surface of the sensor element and extending into the second cavity.

42. (New) The probe of claim 41, wherein the electrode is disposed at the through-hole of the sensor element.

43. (New) The probe of claim 40, further comprising a third cavity provided in the upper surface of the sensor element such that a thin plate is formed at the bottom surface of the sensor element, the through-hole being provided in the thin plate of the sensor element.